SOME NEW COLLEMBOLA FROM UTAH AND IDAHO

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The forms described in this paper are from material sent to me for study by George F. Knowlton and S. C. Ma whom I wish to thank for their interest and copious collecting in this region. Type material is at present in my collection.

Onychiurus magninus n.sp. (figs. 1–5).

Length up to 3 mm. White with lead-grayish tinge. Postantennal organ (fig. 1) consists of 7 large, elongate tubercles. Antennae equal to head, the segments as: 20: 25: 30: 40. Organ of 3rd antennal segment (fig. 2) with 5 guard setae, five finely tuberculate papillae and a pair of smooth sense rods. Fourth antennal segment with olfactory hairs. Pseudocelli as follows: on each side of head: 4 in a row at base of antennal (fig. 3); none on posterior of head; on each side of body as: 0, 1, 1, 1, 1, 0, 2, 4, 0. Unguis (fig. 5) stout, curving, unarmed. Unguiculus unarmed, lamellate, extending in an unusual long curving filament almost to tip of unguis. Anal spines (fig. 4) slightly curved, stout, equal to hind unguis in length. Long curving setae at posterior end of body. Clothing in general of short curving setae with sparse longer ones. Integument rather heavily tuberculate.

This form is distinguished by the shape of the postantennal organ, which is of the *subtenuis* type, and also by the number and arrangement of the pseudocelli on head and body.

Type locality: Logan Canyon, Utah, Oct. 31, 1949, from birch leaves, G. F. Knowlton and S. C. Ma.

Onychiurus mai n.sp. (figs. 6–11).

Length up to 1.5 mm. White. Postantennal organ (fig. 6) with two rows of nuclei-like bodies, surrounded by a mass of simple tubercles. Antennae shorter than head or as: 8: 10, the segments as: 12: 20: 20: 32. Organ of the third antennal segment (fig. 7) with 5 guard setae, 4 papillae, 2 small sense rods, and 2 large coarsely tuberculate sense clubs. Fourth antennal segment with numerous olfactory hairs. Pseudocelli as follows on each side: on head, 3 at base of antenna, 2 on posterior of head (fig. 8); on body as (fig. 10): prothorax 1, metathorax 2, metathorax 2, abdominal segments 2 through 4 with 2 (obliquely situated), abd. 5 with 3

(obliquely situated), and none on abd. 6. Lateral body ocelli present. One pseudocellus on each precoxal. Unguis (fig. 11) stout, curving, unarmed. Unguiculus unarmed, lamellate, extending in a curving filament to about two-thirds length of unguis. Anal spines 2 (fig. 9) shorter than hind unguis or as: 10: 13. Long curving setae at posterior end of body. Clothing of scattered long straight setae and sparse short setae.

The number and arrangement of ocelli on head and body distinguishes this species from closely related ones.

Type locality: Logan Canyon, Utah, Nov. 19, 1949, G. F. Knowlton and S. C. Ma.

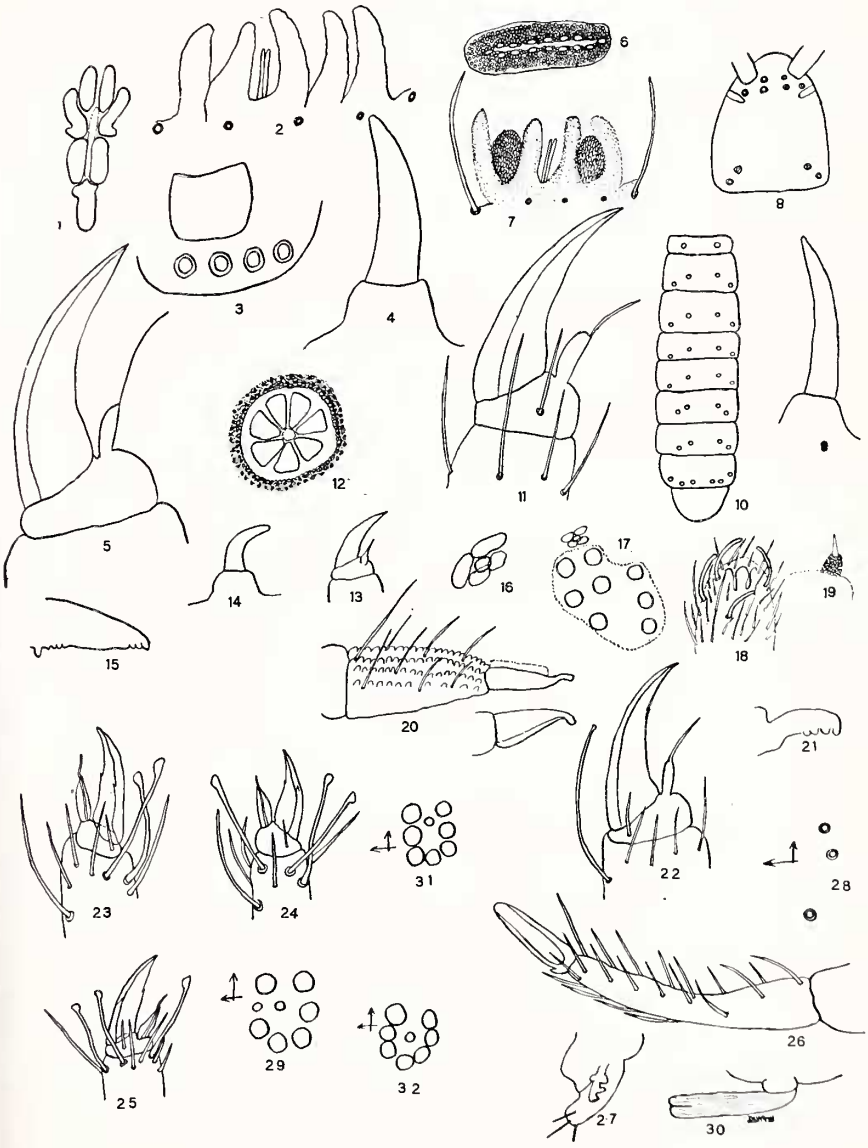
Willemia vashtia n.sp. (figs. 12–15).

Color yellow (in alcohol). Length up to 0.6 mm. Eyes absent. Antennae somewhat shorter than head or as: 45: 50, length of the segments as: 10: 10: 14: 18. The 3rd and 4th antennal segment almost fused. The 4th with at least 4 olfactory hairs, and an apical retractile knob. Sense organ of 3rd antennal segment of 2 small sense rods behind a fold. Postantennal organ (fig. 12) consists of 7 tubercles in a pit. Mandible (fig. 15) with 2 to 3 apical teeth and a larger basal one. Unguis (fig. 13) small, curving, untoothed. Unguiculus small, spine-like, with an enlarged base, one-third as long as unguis. Tenent hairs absent. Furcula absent. Anal horns (fig. 14) 2, small, curving, about half as long as hind unguis. Body segments as: 10: 34: 40: 40: 35: 64: 25: 15;

Explanation of Plate I

Plate I. *Onychiurus magninus*. n. sp. Fig. 1. Postantennal organ. 2. Organ of 3rd antennal segment. 3. Pseudocelli at base of antennae. 4. Anal spines. 5. Hindifoot. *Onychiurus mai* n. sp. 6. Postantennal organ. 7. Organ of 3rd antennal segment. 8. Pseudocelli of head. 9. Anal Spines. 10. Pseudocelli of body. 11. Hind foot. *Willemia vashtia* n. sp. 12. Postantennal organ. 13. Unguis. 14. Anal horns. 15. Mandible. *Achorutes promatro* n. sp. 16. Postantennal organ. 17. Eyes. 18. Fourth antennal segment. 19. Anal spine. 20. Mucro-dens. 21. Tenaculum. 22. Hind foot. *Deuterosminthurus neopandus* n. sp. 23. Hind foot. 24. Middle foot. 25. Front foot. 26. Dens-mucro. 27. Tenaculum. 28. Bothriotrichia of side of abdomen. 29. Eyes. 30. Female and appendage. 31. Eyespot of *D. repandus* Agren. 32. Eyespot of *B. arvalis* (Fitch) (after Folsom).

BULL. B. E. S. VOL. XLV PLATE I



the 4th being much longer than the others. Hairs sparse on first two segments of antennae but become numerous on 3rd and 4th segments. Setae sparse and short on head, thorax, and first 3 abdominal segments, but become numerous and longer on 4th to 6th segments, with those on 6th longer than all. Integument finely granulate.

This species is distinguished mainly by the 7 tubercles of the postantennal organ in a deep pit.

Type localities: Logan Canyon, Utah, Oct. 31, 1949, from birch leaves; Lakota, Utah, Nov. 19, 1949, from willow leaves; Garden City, Utah, Nov. 19, 1949, from willow leaves; all collected by G. F. Knowlton and S. C. Ma.

Achorutes promatro n.sp. (figs. 16–22).

Length up to 1.0 mm. Light grayish to grayish-blue, sometimes grayish-red in color, speckled and spotted with reddish-purple round spots all over. Antennae shorter than head or as: 35: 40, with antennal segments as: 8: 8: 10: 12. Fourth segment with an inverted globular sense knob at apical end, and with several bent sense hairs (fig. 18). Eyes (fig. 17) eight on each side. Postantennal organ (fig. 16) with four tubercles and a central "Nebenhöcker), the two anterior tubercles somewhat larger than others. Body stout, somewhat spindale-shaped posteriorly. Unguis (fig. 22) rather stout, long, and with a weak tooth on inner margin about a third from apex. Unguiculus two-thirds as long as unguis, lanceolate and ending in a fine filament reaching to unguicular tooth. One long knobbed tenent hair, reaching as far as unguiculus. Manubrium to dentes to mucro as: 15: 12: 4. Dentes (fig. 20) stout, tapering slightly, with large dorsal tubercles and with about 7 dorsal setae. Mucro (fig. 20) triangular, tapering toward apex and with tip bent slightly downward, and with a small outer lamella. Anal spines (fig. 19) two, very small, almost straight, about one-fourth hind unguis in length. Clothing of sparse short, curving setae. Tenaculum (fig. 21) quadridentate.

This species is very near *A. maturus* Folsom, but differs in having large heavy dorsal tubercles dorsally on dentes, differences in post-antennal organ, mucro, and in having the inverted sense knob at apex of 4th antennal segment.

Type localities: Franklin, Idaho, Nov. 2, 1949, from Colorado blue spruce, G. F. Knowlton and S. C. Ma; Logan, Utah, Nov. 2, 1949, on ash tree (Almago), G. F. Knowlton and S. C. Ma.

Deuterosminthurus neopandus n.sp. (figs. 23-30).

Length up to 1.5 mm. Color yellow with black eyespots and a black spot on front between eyes. Antennae yellow on first two segments, last two purplish. Legs lighter. Transverse depression behind middle of abdomen. Eyes (fig. 29) 8 on each side, the two median inner eyes smaller than others. Antennae longer than head, with lengths of segments as: 15: 30: 35: 82. Fourth antennal segment with 5 subsegments, besides the basal and apical segments, with a whorl of hairs on each annulation. With at least 3 bothriotrichia laterally on abdomen and one on anogenital segment. The lateral bothriotrichia (fig. 28) forming an angle, ventral one twice as far from median one than dorsal. Unguis (figs. 23–25) rather straight, with a pair of lateral teeth and one on inner margin two-thirds from apex. Unguiculus, lamellate, and with a filament at apex which extends at least two-thirds of unguis. Tenent hairs 2 or 3, varying from 2 on hind foot to 3 on mid and front foot. Mucro (fig. 26) spoon-shaped, to the dens as: 20: 60. Dens longer than manubrium with at least 2 rows of dorsal setae and with 4 appressed ventral setae. Anal appendage (fig. 30) blade-shaped, divided at apex. Tenaculum (fig. 27) tridentate, and with 3 setae on apical lobe.

This form is near *D. repandus* Agren. in color and general appearance and also to *Bourletiella arvalis* (Fitch) as to color pattern. However, as to the latter genus I have not been able to find any indications of dorsal hooks on anal segment and also the female anal appendage is entirely different, as well as, the eye pattern. Therefore, this form is placed in the group with *D. repandus,* from which it differs in averaging larger in size (comparing the cotypes with hundreds of *repandus*), differences in dens-mucro, eye pattern, and in other structures.

Type locality: Wellsville, Utah, May 17, 1949, on dandelion, Allan and S. C. Ma.